



Status of Moog SureFly Hover Test and Progress on Noise Prediction Efforts

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This work is funded by NASA's Revolutionary Vertical Lift Technology projects

Overview of SureFly Measurements

- Ground run-up: November 2019,
NASA/TM-20210015042
- Electric motor noise measurements:
August 2021
- 15-foot hover test: June 2022
- Anticipated full hover test: August 2023
- Sterna rotor procured: February 2023



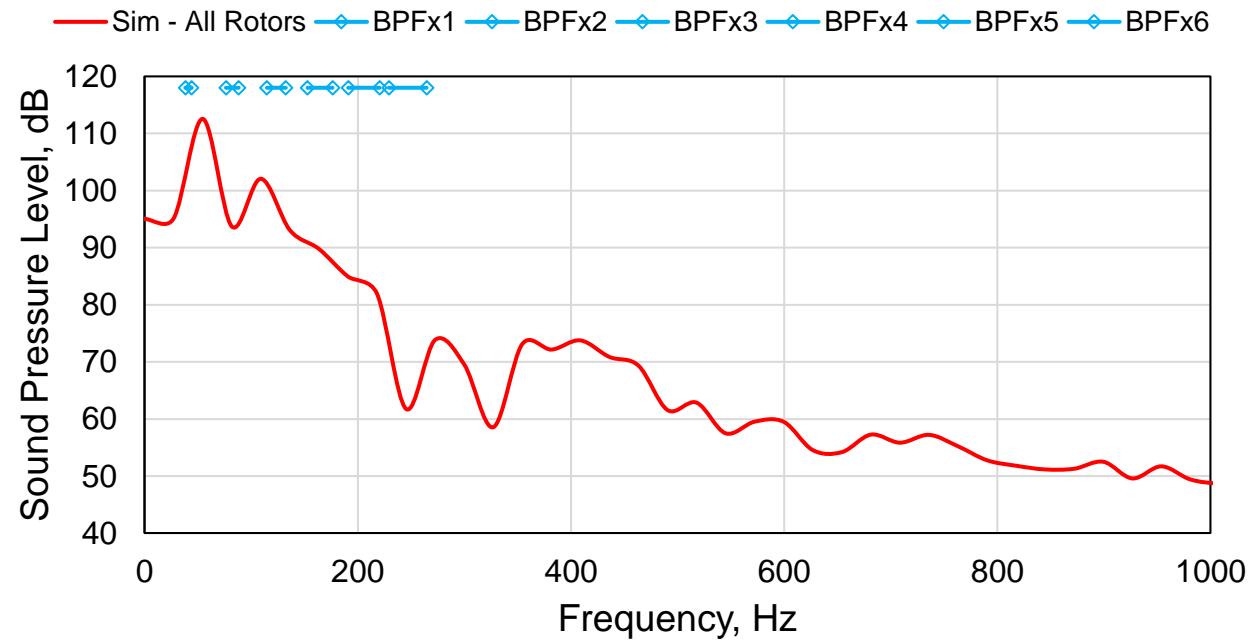
Progress on Hover Tests

- 2022 hover test
 - Working with precise vehicle positioning, planned GPS coordination test week of March 12th
 - Vehicle data
- 2023 hover test
 - SureFly testing moved to the Springfield airport: February 2023
 - Springfield allows for flight well above 15 feet
 - NASA's hover test at various altitudes are anticipated to begin second half of 2023
 - **Higher altitudes allow for acoustic measurements out of ground effect**
 - Currently working with Moog on precise vehicle positioning



Noise Predictions

- CAMRADII coupled with AARON/ANOPP2 via pyaaron
 - Model of SureFly includes all 8 rotors
 - RPM controlled, so rotor tip speed is specified as input
 - Free wake
- Assumptions
 - No droop or sweep included in the model
 - NACA0012 airfoil tables used in place of custom tables
 - Rigid blade assumption
- Future predictions
 - Custom airfoil tables will be developed
 - Update droop and sweep from measurements
 - Update blade rigidity



Sterna Blade Topology

- Sterna 92" diameter rotor
 - Procured Sterna blade for the purpose of scanning and obtaining surface coordinates
 - Sterna has granted permission to release NASA's measured coordinates publicly
 - Structural analysis tests to get bulk properties are planned



- Two blades, connecting hub, and Emrax 268 motor (used on SureFly) are available for future testing

Status of Sterna Blade Scanning

- 3D scanning requirements and best practices meeting with Ames, Glenn, and Langley personnel: February 8th, 2023
- Preliminary mid resolution scan: February 9th, 2023
 - Quantum Max FaroArm used for scanning
 - Initial scan included ~250k points
 - Concern of inadequate resolution along the trailing edge at some cross-sectional stations
- High resolution scan: March 2023
 - >1 million points anticipated
 - Working to get data in a useable file format



Conclusions

- SureFly has transitioned testing to the Springfield airport, allowing for development at higher altitudes
- NASA acoustic measurements at higher altitudes are anticipated for the second half of 2023
- CAMRADII model has been developed
- Sterna blade topology scanning at high resolution is underway

- We are actively seeking measurement opportunities



Questions/Suggestions/Comments/Concerns??



Thank you for your attention!